

AMENDMENTS TO THE CLAIMS

1 1. – 4. (Canceled)

1 5. (Currently Amended) An apparatus in a directory-enabled network element, wherein
2 said network element is any one of a packet router and a data switch operable to
3 manipulate packets at any of Open System Interconnection (OSI) Layer 2 and 3 in a
4 network, the apparatus comprising:

5 a directory enabling element ~~installed in and executed by~~ operable under control of an
6 operating system of the network element, wherein the network element is any
7 ~~one of a packet router and a data switch capable of manipulating packets at~~
8 ~~any of Open System Interconnection (OSI) Layer 2 and 3, wherein the~~
9 directory enabling element is configured to query, access, and update
10 directory information that is managed by a directory service of ~~[[a]]~~ the
11 network that includes the network element, wherein the directory service is
12 any one of a Lightweight Directory Access Protocol (LDAP) directory and an
13 X.500 directory;

14 an application programming interface coupled to the directory enabling element and
15 configured to receive directory services requests from application programs
16 and provide the directory services requests to the directory enabling element,
17 wherein the application programs are hosted in the network element;

18 a locator service coupled to the directory enabling element and accessible using the
19 application programming interface and configured to enable the application

20 programs to locate servers that provide the directory services in the network;
21 and
22 a bind service in the directory enabling element and coupled to a security protocol
23 and configured to bind an external application program to the security
24 protocol.

1 6. (Currently Amended) An apparatus ~~directory-enabled network element~~ as recited in
2 Claim 5, further comprising a Unicode translation service configured to query, access,
3 and update directory information that is encoded in a Unicode international character
4 format.

1 7. (Currently Amended) An apparatus in a ~~directory-enabled network element, wherein~~
2 said network element is any one of a packet router and a data switch operable to
3 manipulate packets at any of Open System Interconnection (OSI) Layer 2 and 3 in a
4 network, the apparatus comprising:
5 a directory enabling element ~~installed in and executed by~~ operable under control of an
6 operating system of the network element, ~~wherein the network element is any~~
7 ~~one of a packet router and a data switch capable of manipulating packets at~~
8 ~~any of Open System Interconnection (OSI) Layer 2 and 3, wherein the~~
9 directory enabling element is configured to query, access, and update
10 directory information that is managed by a directory service of ~~[[a]]~~ the
11 network that includes the network element, wherein the directory service is
12 any one of a Lightweight Directory Access Protocol (LDAP) directory and an
13 X.500 directory;

14 an application programming interface coupled to the directory enabling element and
15 configured to receive directory services requests from application programs
16 and provide the directory services requests to the directory enabling element,
17 wherein the application programs are hosted in the network element;
18 a locator service coupled to the directory enabling element and accessible using the
19 application programming interface and configured to enable the application
20 programs to locate servers that provide the directory services in the network;
21 and
22 an event service coupled to the directory enabling element and configured to receive
23 registration of an event and an associated responsive action from an
24 application program, notify the application program when the event occurs,
25 and execute the associated responsive action in response thereto.

1 8. (Canceled)

1 9. (Currently Amended) An apparatus ~~directory-enabled network element~~ as recited in
2 Claim 5, further comprising a group policy interface coupled to the directory
3 enabling element and configured to receive and update the directory service with one
4 or more definitions of directory services policies that apply to groups of network
5 devices in the network.

1 10. (Currently Amended) An apparatus ~~directory-enabled network element~~ as recited in
2 Claim 5, further comprising

3 an event service coupled to the directory enabling element and accessible using the
4 application programming interface and configured to receive registration of an
5 event and an associated responsive action from an application program, notify
6 the application program when the event occurs, and execute the associated
7 responsive action in response thereto.

1 11. (Canceled)

1 12. (Currently Amended) An apparatus in a directory-enabled packet router, wherein
2 said packet router is operable to manipulate packets at any of Open System
3 Interconnection (OSI) Layer 2 and 3 for in a packet-switched network, the apparatus
4 comprising:
5 a directory enabling element ~~installed in and executed by~~ operable under control of an
6 operating system of the packet router, wherein the packet router is capable of
7 manipulating packets at any of Open System Interconnection (OSI) Layer 2
8 and 3, wherein the directory enabling element is configured to query, access,
9 and update directory information that is managed by a directory service of the
10 packet-switched network, wherein the directory service is any one of a
11 Lightweight Directory Access Protocol (LDAP) directory and an X.500
12 directory;
13 a bind service in the directory enabling element and coupled to a security protocol
14 and configured to bind an application program to the security protocol; and
15 an event service coupled to the directory enabling element and accessible using the
16 application programming interface and configured to receive registration of an

17 event and an associated responsive action from an application program, notify
18 the application program when the event occurs, and execute the associated
19 responsive action in response thereto.

1 13. (Canceled)

1 14. (Currently Amended) An apparatus in a directory-enabled network data switch,
2 wherein said data switch is operable to manipulate packets at any of Open System
3 Interconnection (OSI) Layer 2 and 3 ~~for~~ in a packet-switched network, the apparatus
4 comprising:
5 a directory enabling element ~~installed in and executed by~~ operable under control of an
6 operating system of the data switch, ~~wherein the data switch is capable of~~
7 ~~manipulating packets at any of Open System Interconnection (OSI) Layer 2~~
8 ~~and 3,~~ wherein the directory enabling element is configured to query, access,
9 and update directory information that is managed by a directory service of the
10 packet-switched network, wherein the directory service is any one of a
11 Lightweight Directory Access Protocol (LDAP) directory and an X.500
12 directory;
13 a bind service in the directory enabling element and coupled to a security protocol
14 and configured to bind an application program to the security protocol; and
15 an event service coupled to the directory enabling element and accessible using the
16 application programming interface and configured to receive registration of an
17 event and an associated responsive action from an application program, notify

18 the application program when the event occurs, and execute the associated
19 responsive action in response thereto.

1 15. (Canceled)

1 16. (Currently Amended) A computer-readable medium carrying one or more sequences
2 of instructions for ~~using a directory-enabled~~ network element, wherein said network
3 element is any one of a packet router and a data switch operable to manipulate
4 packets at any of Open System Interconnection (OSI) Layer 2 and 3 in a network,
5 wherein execution of the one or more sequences of instructions by one or more
6 processors of the network element causes the one or more processors to perform the
7 steps of:
8 creating and storing a directory enabling element ~~installed in and executed by~~
9 operable under control of an operating system of the network element,
10 ~~wherein the network element is any one of a packet router and a data switch~~
11 ~~capable of manipulating packets at any of Open System Interconnection (OSI)~~
12 ~~Layer 2 and 3,~~ wherein the directory enabling element is configured to query,
13 access, and update directory information that is managed by a directory
14 service of ~~[[a]]~~ the network that includes the network element, wherein the
15 directory service is any one of a Lightweight Directory Access Protocol
16 (LDAP) directory and an X.500 directory;
17 binding an application program to a security protocol;
18 creating an event and an associated responsive action that are associated with the
19 application program; and

20 in response to occurrence of the event, executing the responsive action, obtaining
21 policy information from the directory service, and converting the policy
22 information into one or more commands that are executable by the ~~directory-~~
23 ~~enabled~~ network element.

1 17. (Original) A computer-readable medium as recited in Claim 16, wherein execution of
2 the one or more sequences of instructions by one or more processors causes the one
3 or more processors to perform the further steps of:
4 locating a nearest directory server and binding the application program to the nearest
5 directory server that is located;
6 locating a nearest event server and binding the application program to the nearest
7 event server that is located.

1 18. (Original) A computer-readable medium as recited in Claim 16, wherein execution of
2 the one or more sequences of instructions by one or more processors causes the one
3 or more processors to perform the further steps of:
4 translating the policy information into one or more values that are ready to apply to a
5 router, whereby a virtual private network is created between the router and
6 another network device.

1 19. (Original) A computer-readable medium as recited in Claim 16, wherein execution of
2 the one or more sequences of instructions by one or more processors causes the one
3 or more processors to perform the further steps of:

4 translating the policy information into one or more values that are ready to apply to a
5 set of internal data structures of a router, by calling one or more internal NOS
6 API functions, whereby a dynamic IPSEC configuration is created that
7 connects the router and at least one other network device.

1 20. (Original) A computer-readable medium as recited in Claim 16, wherein execution of
2 the one or more sequences of instructions by one or more processors causes the one
3 or more processors to perform the further steps of establishing an application
4 programming interface coupled to the directory enabling element and configured to
5 receive directory services requests from application programs and provide the
6 directory services requests to the one or more processors.

1 21. (Canceled)

1 22. (Canceled)

1 23. (Currently Amended) A system comprising a network element enabled to
2 automatically interface with directory services in a network, wherein the network
3 element is any one of a packet router and a data packet switch operable to manipulate
4 packets at any of Open System Interconnection (OSI) Layer 2 and 3 in the network,
5 wherein the network element comprises:
6 a directory enabling element ~~installed in and executed by~~ operable under control of an
7 operating system of the network element, wherein the network element is any
8 ~~one of a packet router and a data packet switch capable of manipulating~~

9 ~~packets at any of Open System Interconnection (OSI) Layer 2 and 3~~, wherein
10 the directory enabling element is configured to query, access, and update
11 directory information that is managed by directory services of the network
12 that includes the network element, wherein the directory services include at
13 least one of a Lightweight Directory Access Protocol (LDAP) directory and
14 an X.500 directory; and
15 a locator service coupled to the directory enabling element and configured to locate
16 servers that provide the directory services in the network;
17 wherein the network element obtains policy information from the directory services
18 and updates the directory service.

1 24. (Previously Presented) The system of Claim 23, wherein the network element
2 includes a protocol agent for interfacing with the directory services.

1 25. (Canceled)

1 26. (Canceled)